

quanteda

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Type Package

Title Quantitative Analysis of Textual Data

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Description A package for the management and quantitative analysis of textual data with R. quanteda makes it easy to manage texts in the form of a corpus, defined as a collection of texts that includes document-level variables specific to each text, as well as meta-data for documents and for the collection as a whole. quanteda includes tools to make it easy and fast to manipulate the texts in a corpus, for instance by tokenizing them, with or without stopwords or stemming, or to segment them by sentence or paragraph units. quanteda includes a suite of sophisticated tools to extract features of the texts into a quantitative matrix, where these features can be defined according to a dictionary or thesaurus, including the declaration of collocations to be treated as single features. Once converted into a quantitative matrix (known as a ``dfm" for document-feature matrix), the textual features can be analyzed using quantitative methods for describing, comparing, or scaling texts, or topic modelling, or used to train machine learning methods for class prediction.

License GPL-3

Depends R (>= 3.0)

Imports methods,
Matrix (>= 1.1),
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```
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```

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BugReports <https://github.com/kbenoit/quanteda/issues>

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```
'clean.R'
'collocations.R'
'converters.R'
'corpus-sources-S4.R'
'corpus.R'
'dataDocs.R'
'describe-texts.R'
'dfm-classes.R'
'dfm-main.R'
'dictionaryFunctions.R'
'distance.R'
'gui.R'
'kwic.R'
'lexdiv.R'
'ngrams.R'
'onLoad.R'
'plots.R'
'quanteda-package.R'
'resample.R'
'settings.R'
'stopwords.R'
'syllables.R'
'textmodel-generics.R'
'textmodel-wordfish.R'
'textmodel-wordscores.R'
'tokenize.R'
```

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quanteda-package	<i>An R package for the quantitative analysis of textual data.</i>
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Description

A set of functions for creating and managing text corpora, extracting features from text corpora, and analyzing those features using quantitative methods.

More detailed description, and some examples, to go [here](#).

Author(s)

Ken Benoit and Paul Nulty

bigrams

*Create bigrams***Description**

Create bigrams

Usage

```
bigrams(text, window = 1, concatenator = "_", include.unigrams = FALSE,
        ignoredFeatures = NULL, skipGrams = FALSE, ...)
```

Arguments

text	character vector containing the texts from which bigrams will be constructed
window	how many words to be counted for adjacency. Default is 1 for only immediately neighbouring words. This is only available for bigrams, not for ngrams.
concatenator	character for combining words, default is _ (underscore) character
include.unigrams	if TRUE, return unigrams as well
ignoredFeatures	a character vector of features to ignore
skipGrams	If FALSE (default), remove any bigram containing a feature listed in ignoredFeatures, otherwise, first remove the features in ignoredFeatures, and then create bigrams. This means that some "bigrams" will actually not occur as adjacent features in the original text. See examples.
...	provides additional arguments passed to tokenize

Value

a character vector of bigrams

Author(s)

Ken Benoit and Kohei Watanabe

Examples

```
bigrams("The quick brown fox jumped over the lazy dog.")
bigrams(c("The quick brown fox", "jumped over the lazy dog."))
bigrams(c("The quick brown fox", "jumped over the lazy dog."), window=2)
bigrams(c("I went to tea with her majesty Queen Victoria.", "Does tea have extra caffeine?"))
bigrams(c("I went to tea with her majesty Queen Victoria.", "Does tea have extra caffeine?"),
        ignoredFeatures=stopwords("english"))
bigrams(c("I went to tea with her majesty Queen Victoria.", "Does tea have extra caffeine?"),
        ignoredFeatures=stopwords("english"), skipGrams=TRUE)
```

changeunits

change the document units of a corpus

Description

For a corpus, recast the documents down or up a level of aggregation. "Down" would mean going from documents to sentences, for instance. "Up" means from sentences back to documents. This makes it easy to reshape a corpus from a collection of documents into a collection of sentences, for instance.

Usage

```
changeunits(corp, to = c("sentences", "paragraphs", "documents"), ...)
```

Arguments

corp	corpus whose document units will be reshaped
to	new documents units for the corpus to be recast in
...	passes additional arguments to segment

Examples

```
# simple example
mycorpus <- corpus(c(textone="This is a sentence. Another sentence. Yet another.",
                     texttwo="Premiere phrase. Deuxieme phrase."),
                  docvars=list(country=c("UK", "USA"), year=c(1990, 2000)),
                  notes="This is a simple example to show how changeunits() works.")
language(mycorpus) <- c("english", "french")
summary(mycorpus)
summary(changeunits(mycorpus, to="sentences"), showmeta=TRUE)

# example with inaugural corpus speeches
mycorpus2 <- subset(inaugCorpus, Year>2004)
mycorpus2
paragCorpus <- changeunits(mycorpus2, to="paragraphs")
paragCorpus
summary(paragCorpus, 100, showmeta=TRUE)
## Note that Bush 2005 is recorded as a single paragraph because that text used a single
## \n to mark the end of a paragraph.
```

clean

simple cleaning of text before processing

Description

clean removes punctuation and digits from text, using the regex character classes for punctuation and digits. clean uses the standard R function tolower to convert the text to lower case. Each of these steps is optional, but switched on by default, so for example, to remove punctuation and convert to lower, but keep digits, the command would be: clean(mytexts, removeDigits=FALSE)

Usage

```
clean(x, ...)

## S3 method for class character
clean(x, removeDigits = TRUE, removePunct = TRUE,
      toLower = TRUE, removeAdditional = NULL, removeTwitter = FALSE,
      removeURL = TRUE, ...)

## S3 method for class corpus
clean(x, removeDigits = TRUE, removePunct = TRUE,
      toLower = TRUE, removeAdditional = NULL, removeTwitter = FALSE, ...)

cleanC(x, removeDigits = TRUE, removePunct = TRUE, toLower = TRUE,
      removeAdditional = NULL, removeTwitter = FALSE, removeURL = TRUE, ...)
```

Arguments

x	The object to be cleaned. Can be either a character vector or a corpus object. If x is a corpus, clean returns the corpus containing the cleaned texts.
...	additional parameters
removeDigits	remove numbers if TRUE
removePunct	remove punctuation if TRUE
toLower	convert text to lower case TRUE
removeAdditional	additional characters to remove (regular expression)
removeTwitter	if FALSE, do not remove @ or #
removeURL	removes URLs (web addresses starting with http: or https:), based on a regular expression from http://daringfireball.net/2010/07/improved_regex_for_matching_urls

Details

cleanC is KB's adaptation from KW's code for tokenization and cleaning, for testing.

Value

A character vector equal in length to the original texts, after cleaning.

Examples

```
clean("This is 1 sentence with 2.0 numbers in it, and one comma.", removeDigits=FALSE)
clean("This is 1 sentence with 2.0 numbers in it, and one comma.", toLower=FALSE)
clean("We are his Beliebers, and him is #ourjustin @justinbieber we luv u", removeTwitter=TRUE)
clean("Collocations can be represented as inheritance_tax using the _ character.")
clean("But under_scores can be removed with removeAdditional.", removeAdditional="[_]")
clean("This is a $1,500,000 budget and $20bn cash and a $5 cigar.")
clean("This is a $1,500,000 budget and $20bn cash and a $5 cigar.", removeDigits=FALSE)
clean("URL regex from http://daringfireball.net/2010/07/improved_regex_for_matching_urls.")

# for a vector of texts
clean(c("This is 1 sentence with 2.0 numbers in it, and one comma.",
        "$1.2 billion was spent on text analysis in 2014."))
```

```

cleanC("This is 1 sentence with 2.0 numbers in it, and one comma.", removeDigits=FALSE)
cleanC("This is 1 sentence with 2.0 numbers in it, and one comma.", toLower=FALSE)
cleanC("We are his Beliebers, and him is #ourjustin @justinbieber we luv u", removeTwitter=TRUE)
cleanC("Collocations can be represented as inheritance_tax using the _ character.")
cleanC("But under_scores can be removed with removeAdditional.", removeAdditional="[_]")
cleanC("This is a $1,500,000 budget and $20bn cash and a $5 cigar.")
cleanC("This is a $1,500,000 budget and $20bn cash and a $5 cigar.", removeDigits=FALSE)
clean("URL regex from http://daringfireball.net/2010/07/improved_regex_for_matching_urls.")

# on a single long text
mobydick <- texts(corpus(textfile("~/Dropbox/QUANTESS/corpora/project_gutenberg/pg2701.txt")))
system.time(tmp <- cleanC(mobydick)) # .218 seconds
system.time(tmp <- clean(mobydick)) # .776 seconds

# on a longer set of texts (34,070 texts)
load("~/Dropbox/QUANTESS/Manuscripts/Collocations/Corpora/lauderdaleClark/Opinion_files.RData)
txts <- unlist(Opinion_files[1]); names(txts) <- NULL
system.time(tmp <- sapply(txts, cleanC)) # about 20.5 seconds
## Not run: system.time(tmp <- sapply(txts, clean)) # about forever: 647.502 seconds

```

collocations

Detect collocations from text

Description

Detects collocations (currently, bigrams and trigrams) from texts or a corpus, returning a data.frame of collocations and their scores, sorted in descending order of the association measure. Words separated by punctuation delimiters ., !?; : () {} [] are not counted as adjacent and hence are not eligible to be collocations.

Usage

```

collocations(x, ...)

## S3 method for class character
collocations(x, method = c("lr", "chi2", "pmi", "dice",
  "all"), size = 2, n = NULL, ...)

## S3 method for class corpus
collocations(x, method = c("lr", "chi2", "pmi", "dice",
  "all"), size = 2, n = NULL, ...)

```

Arguments

x	a text, a character vector of texts, or a corpus
...	additional parameters passed to clean
method	association measure for detecting collocations. Let i index documents, and j index features, n_{ij} refers to observed counts, and m_{ij} the expected counts in a collocations frequency table of dimensions $(J - size + 1)^2$. Available measures are computed as:

"lr" The likelihood ratio statistic G^2 , computed as:

$$2 * \sum_i \sum_j (n_{ij} * \log \frac{n_{ij}}{m_{ij}})$$

"chi2" Pearson's χ^2 statistic, computed as:

$$\sum_i \sum_j \frac{(n_{ij} - m_{ij})^2}{m_{ij}}$$

"pmi" point-wise mutual information score, computed as $\log n_{11}/m_{11}$

"dice" the Dice coefficient, computed as $n_{11}/n_{1.} + n_{.1}$

"all" returns all of the above

size length of the collocation. Only bigram (n=2) and trigram (n=3) collocations are implemented so far. Can be c(2,3) (or 2:3) to return both bi- and tri-gram collocations.

n the number of collocations to return, sorted in descending order of the requested statistic, or G^2 if none is specified.

Details

Because of incompatibilities with the join operations in [data.table](#) when input files have slightly different encoding settings, collocations currently converts all text to ASCII prior to processing. We hope to improve on this in the future.

Value

A data.table of collocations, their frequencies, and the computed association measure(s).

Author(s)

Kenneth Benoit

References

McInnes, B T. 2004. "Extending the Log Likelihood Measure to Improve Collocation Identification." M.Sc. Thesis, University of Minnesota.

See Also

[bigrams](#), [ngrams](#)

Examples

```
collocations(inaugTexts, n=10)
collocations(inaugCorpus, method="all", n=10)
collocations(inaugTexts, method="chi2", size=3, n=10)
collocations(inaugCorpus, method="pmi", size=3, n=10)
txt <- c("This is software testing: looking for (word) pairs!
        This [is] a software testing again. For.",
        "Here: is a software testing, looking again for word pairs.")
collocations(txt)
collocations(txt, size=2:3)
removeFeatures(collocations(txt, size=2:3), stopwords("english"))
```

convert	<i>convert a dfm to a non-quanteda format</i>
---------	---

Description

Convert a quanteda [dfm-class](#) object to a format useable by other text analysis packages. The general function `convert` provides easy conversion from a dfm to the document-term representations used in all other text analysis packages for which conversions are defined. To make the usage as consistent as possible with other packages, however, quanteda also provides direct conversion functions in the idiom of the foreign packages, for example `as.wfm` to coerce a dfm into the [wfm](#) format from the **austin** package, and `quantedaformat2dtm` for using a dfm with the **topicmodels** package.

Usage

```
convert(x, to, ...)

## S3 method for class dfm
convert(x, to = c("lda", "tm", "stm", "austin", "topicmodels"),
  ...)

as.wfm(x)

## S3 method for class dfm
as.wfm(x)

as.DocumentTermMatrix(x, ...)

## S3 method for class dfm
as.DocumentTermMatrix(x, ...)

dfm2ldaformat(x)

## S3 method for class dfm
dfm2ldaformat(x)

quantedaformat2dtm(x)

## S3 method for class dfm
quantedaformat2dtm(x)
```

Arguments

<code>x</code>	dfm to be converted
<code>to</code>	target conversion format, consisting of the name of the package into whose document-term matrix representation the dfm will be converted: "lda" a list with components "documents" and "vocab" as needed by lda.collapsed.gibbs.sampler from the lda package "tm" a DocumentTermMatrix from the tm package "stm" the format for the stm package "austin" the wfm format from the austin package

"topicmodels" the "dtm" format as used by the **topicmodels** package
 ... not used here

Details

as.wfm converts a quanteda [dfm](#) into the [wfm](#) format used by the **austin** package.

as.DocumentTermMatrix will convert a quanteda [dfm](#) into the **tm** package's [DocumentTermMatrix](#) format.

dfm2ldaformat provides converts a [dfm](#) into the list representation of terms in documents used by the **lda** package.

quantedaformat2dtm provides converts a [dfm](#) into the sparse simple triplet matrix representation of terms in documents used by the **topicmodels** package.

Value

A converted object determined by the value of to (see above). See conversion target package documentation for more detailed descriptions of the return formats.

For individual converters in the foreign package idioms, return values are:

dfm2ldaformat returns a list with components "documents" and "vocab" as needed by [lda.collapsed.gibbs.sampler](#).

quantedaformat2dtm returns a "dtm" sparse matrix object for use with the **topicmodels** package.

Note

The **tm** package version of as.TermDocumentMatrix allows a weighting argument, which supplies a weighting function for [TermDocumentMatrix](#). Here the default is for term frequency weighting. If you want a different weighting, apply the weights after converting using one of the **tm** functions.

Examples

```
mycorpus <- subset(inaugCorpus, Year>1970)
quantdfm <- dfm(mycorpus, verbose=FALSE)

# austins wfm format
austindfm <- as.wfm(quantdfm)
identical(austindfm, convert(quantdfm, to="austin"))
## Not run: wftest <- austin::wordfish(austindfm)

# tms DocumentTermMatrix format
tmdfm <- as.DocumentTermMatrix(quantdfm)
str(tmdfm)

# stm package format
stmdfm <- convert(quantdfm, to="stm")
str(stmdfm)

# topicmodels package format
topicmodelsdfm <- quantedaformat2dtm(quantdfm)
identical(topicmodelsdfm, convert(quantdfm, to="topicmodels"))

# lda package format
ldadfm <- convert(quantdfm, to="lda")
str(ldadfm)
```

```

identical(ldadfm, stmdfm[1:2])
# calling dfm2ldaformat directly
ldadfm <- dfm2ldaformat(quantdfm)
str(ldadfm)

```

corpus

constructor for corpus objects

Description

Creates a corpus from a document source. The current available document sources are:

- a character vector (as in R class `char`) of texts;
- a [corpusSource-class](#) object, constructed using [textfile](#);
- a **tm** [VCorpus](#) class corpus object, meaning that anything you can use to create a **tm** corpus, including all of the tm plugins plus the built-in functions of tm for importing pdf, Word, and XML documents, can be used to create a quanteda [corpus](#).

Corpus-level meta-data can be specified at creation, containing (for example) citation information and notes, as can document-level variables and document-level meta-data.

Usage

```

corpus(x, ...)

## S3 method for class character
corpus(x, enc = NULL, docnames = NULL, docvars = NULL,
       source = NULL, notes = NULL, citation = NULL, ...)

## S3 method for class corpusSource
corpus(x, enc = NULL, notes = NULL,
       citation = NULL, ...)

## S3 method for class VCorpus
corpus(x, enc = NULL, notes = NULL, citation = NULL,
       ...)

is.corpus(x)

## S3 method for class corpus
c1 + c2

```

Arguments

<code>x</code>	a source of texts to form the documents in the corpus, a character vector or a corpusSource-class object created using textfile .
<code>...</code>	additional arguments
<code>enc</code>	A string specifying the input encoding for texts in the corpus. Must be a valid entry in iconvlist() , since the code in <code>corpus.character</code> will convert this to UTF-8 using iconv . Currently only one input encoding can be specified for a collection of input texts, meaning that you should not mix input text encoding types in a single corpus call.

docnames	Names to be assigned to the texts, defaults to the names of the character vector (if any), otherwise assigns "text1", "text2", etc.
docvars	A data frame of attributes that is associated with each text.
source	A string specifying the source of the texts, used for referencing.
notes	A string containing notes about who created the text, warnings, To Dos, etc.
citation	Information on how to cite the corpus.
c1	corpus one to be added
c2	corpus two to be added

Details

The + operator for a corpus object will combine two corpus objects, resolving any non-matching [docvars](#) or [metadoc](#) fields by making them into NA values for the corpus lacking that field. Corpus-level meta data is concatenated, except for source and notes, which are stamped with information pertaining to the creation of the new joined corpus.

There are some issues that need to be addressed in future revisions of quanteda concerning the use of factors to store document variables and meta-data. Currently most or all of these are not recorded as factors, because we use `stringsAsFactors=FALSE` in the [data.frame](#) calls that are used to create and store the document-level information, because the texts should always be stored as character vectors and never as factors.

Value

A corpus class object containing the original texts, document-level variables, document-level meta-data, corpus-level metadata, and default settings for subsequent processing of the corpus. A corpus consists of a list of elements described below, although these should only be accessed through accessor and replacement functions, not directly (since the internals may be subject to change). The structure of a corpus classed list object is:

\$documents	A data frame containing the document level information, consisting of texts , user-named docvars variables describing attributes of the documents, and metadoc document-level metadata whose names begin with an underscore character, such as <code>_language</code> .
\$metadata	A named list set of corpus-level meta-data, including source and created (both generated automatically unless assigned), notes, and citation.
\$settings	Settings for the corpus which record options that govern the subsequent processing of the corpus when it is converted into a document-feature matrix (dfm). See settings .
\$tokens	An indexed list of tokens and types tabulated by document, including information on positions. Not yet fully implemented.

`is.corpus` returns TRUE if the object is a corpus

Note

When `x` is a [VCorpus](#) object, the fixed metadata fields from that object are imported as document-level metadata. Currently no corpus-level metadata is imported, but we will add that soon.

Author(s)

Kenneth Benoit and Paul Nulty

See Also

[docvars](#), [metadoc](#), [metacorporus](#), [language](#), [encoding](#), [settings](#), [texts](#)

Examples

```
#
# create a corpus from texts
corpus(inaugTexts)

# create a corpus from texts and assign meta-data and document variables
ukimmigCorpus <- corpus(ukimmigTexts,
                        docvars=data.frame(party=names(ukimmigTexts)),
                        enc="UTF-8")
# the fifth column of this csv file is the text field
mytexts <- textfile("http://www.kenbenoit.net/files/text_example.csv", textField=5)
str(mytexts)
mycorp <- corpus(mytexts)
mycorp2 <- corpus(textfile("http://www.kenbenoit.net/files/text_example.csv", textField="Title"))
identical(texts(mycorp), texts(mycorp2))
identical(docvars(mycorp), docvars(mycorp2))
#
## import a tm VCorpus
if (require(tm)) {
  data(crude) # load in a tm example VCorpus
  mytmCorpus <- corpus(crude)
  summary(mytmCorpus, showmeta=TRUE)
}
```

corpusSource-class *corpus source classes*

Description

The corpusSource virtual class is a parent class for more specific corpus source objects.

Slots

texts the texts that form the core of the corpus

docvars document variables in a data.frame

source source recorded for the corpus, based on type of source

created a time stamp

dfm

create a document-feature matrix

Description

Create a sparse matrix document-feature matrix from a corpus or a vector of texts. The sparse matrix construction uses the **Matrix** package, and is both much faster and much more memory efficient than the corresponding dense (regular matrix) representation. For details on the structure of the dfm class, see [dfm-class](#).

Usage

```
dfm(x, ...)
```

```
## S3 method for class character
dfm(x, verbose = TRUE, clean = TRUE, stem = FALSE,
     ignoredFeatures = NULL, keptFeatures = NULL, matrixType = c("sparse",
     "dense"), language = "english", fromCorpus = FALSE, bigrams = FALSE,
     thesaurus = NULL, dictionary = NULL, dictionary_regex = FALSE,
     addto = NULL, ...)
```

```
## S3 method for class corpus
dfm(x, verbose = TRUE, clean = TRUE, stem = FALSE,
     ignoredFeatures = NULL, keptFeatures = NULL, matrixType = c("sparse",
     "dense"), language = "english", groups = NULL, bigrams = FALSE,
     thesaurus = NULL, dictionary = NULL, dictionary_regex = FALSE,
     addto = NULL, ...)
```

```
is.dfm(x)
```

```
as.dfm(x)
```

Arguments

x	corpus or character vector from which to generate the document-feature matrix
...	additional arguments passed to clean
verbose	display messages if TRUE
clean	if FALSE, do no cleaning of the text. This offers a one-argument easy method to turn off any cleaning of the texts during construction of the dfm.
stem	if TRUE, stem words
ignoredFeatures	a character vector of user-supplied features to ignore, such as "stop words". Formerly, this was a Boolean option for stopwords = TRUE, but requiring the user to supply the list highlights the choice involved in using any stopword list. To access one possible list (from any list you wish), use stopwords() .
keptFeatures	a user supplied regular expression defining which features to keep, while excluding all others. This can be used in lieu of a dictionary if there are only specific features that a user wishes to keep. To extract only Twitter usernames, for example, set keptFeatures = "^@\\w+\\b" and make sure that removeTwitter = FALSE

	as an additional argument passed to clean . (Note: <code>keptFeatures = "^@"</code> will also retrieve usernames, but does not enforce the username convention that a username must contain one and only one @ symbol, at the beginning of the username.)
<code>matrixType</code>	if dense, produce a dense matrix; or if sparse produce a sparse matrix of class <code>dgCMatrix</code> from the Matrix package.
<code>language</code>	Language for stemming and stopwords. Choices are danish, dutch, english, finnish, french, german, hungarian, italian, norwegian, porter, portuguese, romanian, russian, spanish, swedish, turkish for stemming, and SMART, danish, english, french, hungarian, norwegian, russian, swedish, catalan, dutch, finnish, german, italian, portuguese, spanish, arabic for stopwords.
<code>fromCorpus</code>	a system flag used internally, soon to be phased out.
<code>bigrams</code>	include bigrams as well as unigram features, if TRUE
<code>thesaurus</code>	A list of character vector "thesaurus" entries, in a dictionary list format, which can also include regular expressions if <code>dictionary_regex</code> is TRUE (see examples). Note that unlike dictionaries, each entry in a thesaurus key must be unique, otherwise only the first match in the list will be used. Thesaurus keys are converted to upper case to create a feature label in the dfm, as a reminder that this was not a type found in the text, but rather the label of a thesaurus key.
<code>dictionary</code>	A list of character vector dictionary entries, including regular expressions (see examples)
<code>dictionary_regex</code>	TRUE means the dictionary is already in regular expression format, otherwise it will be converted from "wildcard" format
<code>addto</code>	NULL by default, but if an existing dfm object is specified, then the new dfm will be added to the one named. If both dfm 's are built from dictionaries, the combined dfm will have its <code>Non_Dictionary</code> total adjusted.
<code>groups</code>	Grouping variable for aggregating documents

Details

New as of v0.7: All dfms are by default sparse, a change from the previous behaviour. You can still create the older (S3) dense matrix type dfm object, but you will receive a disapproving warning message while doing so, suggesting you make the switch.

`is.dfm` returns TRUE if and only if its argument is a [dfm](#).

`as.dfm` coerces a matrix or `data.frame` to a dfm

Value

A [dfm-class](#) object containing a sparse matrix representation of the counts of features by document, along with associated settings and metadata.

If you used `matrixType = "dense"` then the return is an old-style S3 matrix class object with additional attributes representing meta-data.

Author(s)

Kenneth Benoit

Examples

```
# with inaugural texts
(size1 <- object.size(dfm(inaugTexts, matrixType="sparse")))
(size2 <- object.size(dfm(inaugTexts, matrixType="dense")))
cat("Compacted by ", round(as.numeric((1-size1/size2)*100), 1), "%.\n", sep="")

# for a corpus
mydfm <- dfm(inaugCorpus)

# grouping documents by docvars in a corpus
mydfmGrouped <- dfm(inaugCorpus, groups = "President")

# with stopwords English, stemming, and dense matrix
dfmsInaug2 <- dfm(inaugCorpus, ignoredFeatures = stopwordsGet(), stem=TRUE, matrixType="dense")

## with dictionaries
mycorpus <- subset(inaugCorpus, Year>1900)
mydict <- list(christmas=c("Christmas", "Santa", "holiday"),
               opposition=c("Opposition", "reject", "notinacorpora"),
               taxing="taxing",
               taxation="taxation",
               taxregex="tax*",
               country="united states")
dictDfm <- dfm(mycorpus, dictionary=mydict)
dictDfm

## with the thesaurus feature
mytexts <- c("The new law included a capital gains tax, and an inheritance tax.",
             "New York City has raised a taxes: an income tax and a sales tax.")
mydict <- dictionary(list(tax=c("tax", "income tax", "capital gains tax", "inheritance tax")))
dfm(phrasetoToken(mytexts, mydict), thesaurus=lapply(mydict, function(x) gsub("\\s", "_", x)))
# pick up "taxes" with "tax" as a regex
dfm(phrasetoToken(mytexts, mydict), thesaurus=list(anytax="tax"), dictionary_regex=TRUE)

## removing stopwords
testText <- "The quick brown fox named Seamus jumps over the lazy dog also named Seamus, with
             the newspaper from a boy named Seamus, in his mouth."
testCorpus <- corpus(testText)
settings(testCorpus, "stopwords")
dfm(testCorpus, stopwords=TRUE)

## keep only certain words
dfm(testCorpus, keptFeatures="s$", verbose=FALSE) # keep only words ending in "s"
testTweets <- c("My homie @justinbieber #justinbieber shopping in #LA yesterday #beliebers",
               "2all the ha8ers including my bro #justinbieber #emabiggestfansjustinbieber",
               "Justin Bieber #justinbieber #belieber #fetusjustin #EMABiggestFansJustinBieber")
### NEED TO FIX
### dfm(testTweets, keptFeatures="^#") # keep only hashtags

## Not run:
# try it with approx 35,000 court documents from Lauderdale and Clark (200?)
load("~/Dropbox/QUANTESS/Manuscripts/Collocations/Corpora/lauderdaleClark/Opinion_files.RData)
txts <- unlist(Opinion_files[1])
names(txts) <- NULL
```



```

# dfms without cleaning
require(Matrix)
system.time(dfmsBig <- dfm(txts, clean=FALSE, verbose=FALSE))
object.size(dfmsBig)
dim(dfmsBig)
# compare with tm
require(tm)
tmcorp <- VCorpus(VectorSource(txts))
system.time(tmDTM <- DocumentTermMatrix(tmcorp))
object.size(tmDTM)
dim(tmDTM)

# with cleaning - the gsub() calls in clean() take a long time
system.time(dfmsBig <- dfm(txts, clean=TRUE, additional="[-_\\x{h2014}]"))
object.size(dfmsBig)
dim(dfmsBig)
# 100 top features
topf <- colSums(dfmsBig)
names(topf) <- colnames(dfmsBig)
head(sort(topf, decreasing=TRUE), 100)

## End(Not run)

```

dfm-class

Virtual class "dfm" for a document-feature matrix

Description

The dfm class of object is a type of [Matrix-class](#) object with additional slots, described below. **quanteda** uses two subclasses of the dfm class, depending on whether the object can be represented by a sparse matrix, in which case it is a dfmSparse class object, or if dense, then a dfmDense object. See Details.

Usage

```

## S4 method for signature dfm
t(x)

## S4 method for signature dfmSparse
colSums(x, na.rm = FALSE, dims = 1L, ...)

## S4 method for signature dfmDense
colSums(x, na.rm = FALSE, dims = 1L, ...)

## S4 method for signature dfmSparse
rowSums(x, na.rm = FALSE, dims = 1L, ...)

## S4 method for signature dfmDense
rowSums(x, na.rm = FALSE, dims = 1L, ...)

## S3 method for class dfm
x[i, j, ..., drop = FALSE]

```

```
## S4 method for signature dfmDense,index,index,missing
x[i = NULL, j = NULL, ...,
  drop = FALSE]

## S4 method for signature dfmDense,index,index,logical
x[i = NULL, j = NULL, ...,
  drop = FALSE]

## S4 method for signature dfmDense,index,missing,missing
x[i, j, ..., drop = FALSE]

## S4 method for signature dfmDense,index,missing,logical
x[i, j, ..., drop = FALSE]

## S4 method for signature dfmDense,missing,index,missing
x[i, j, ..., drop = FALSE]

## S4 method for signature dfmDense,missing,index,logical
x[i, j, ..., drop = FALSE]

## S4 method for signature dfmDense,missing,missing,missing
x[i, j, ..., drop = FALSE]

## S4 method for signature dfmDense,missing,missing,logical
x[i, j, ..., drop = FALSE]

## S4 method for signature dfmSparse,index,index,missing
x[i = NULL, j = NULL, ...,
  drop = FALSE]

## S4 method for signature dfmSparse,index,index,logical
x[i = NULL, j = NULL, ...,
  drop = FALSE]

## S4 method for signature dfmSparse,index,missing,missing
x[i, j, ..., drop = FALSE]

## S4 method for signature dfmSparse,index,missing,logical
x[i, j, ..., drop = FALSE]

## S4 method for signature dfmSparse,missing,index,missing
x[i, j, ..., drop = FALSE]

## S4 method for signature dfmSparse,missing,index,logical
x[i, j, ..., drop = FALSE]

## S4 method for signature dfmSparse,missing,missing,missing
x[i, j, ..., drop = FALSE]

## S4 method for signature dfmSparse,missing,missing,logical
x[i, j, ..., drop = FALSE]
```

```
## S4 method for signature dfmSparse,numeric
e1 + e2

## S4 method for signature numeric,dfmSparse
e1 + e2

## S4 method for signature dfmDense,numeric
e1 + e2

## S4 method for signature numeric,dfmDense
e1 + e2

## S4 method for signature dfm
as.matrix(x)

## S4 method for signature dfm
as.data.frame(x)
```

Arguments

x	the dfm object
na.rm	if TRUE, omit missing values (including NaN) from the calculations
dims	ignored
...	additional arguments not used here
i	index for documents
j	index for features
drop	always set to FALSE
e1	first quantity in "+" operation for dfm
e2	second quantity in "+" operation for dfm

Details

The `dfm` class is a virtual class that will contain one of two subclasses for containing the cell counts of document-feature matrixes: `dfmSparse` or `dfmDense`.

The `dfmSparse` class is a sparse matrix version of `dfm-class`, inheriting [dgCMatrix-class](#) from the **Matrix** package. It is the default object type created when feature counts are the object of interest, as typical text-based feature counts tend contain many zeroes. As long as subsequent transformations of the `dfm` preserve cells with zero counts, the `dfm` should remain sparse.

When the **Matrix** package implements sparse integer matrixes, we will switch the default object class to this object type, as integers are 4 bytes each (compared to the current numeric double type requiring 8 bytes per cell.)

The `dfmDense` class is a sparse matrix version of `dfm-class`, inheriting [dgeMatrix-class](#) from the **Matrix** package. `dfm` objects that are converted through weighting or other transformations into cells without zeroes will be automatically converted to the `dfmDense` class. This will necessarily be a much larger sized object than one of `dfmSparse` class, because each cell is recorded as a numeric (double) type requiring 8 bytes of storage.

Slots

settings settings that govern corpus handling and subsequent downstream operations, including the settings used to clean and tokenize the texts, and to create the dfm. See [settings](#).

weighting the feature weighting applied to the dfm. Default is "frequency", indicating that the values in the cells of the dfm are simple feature counts. To change this, use the [weight](#) method.

smooth a smoothing parameter, defaults to zero. Can be changed using either the [smooth](#) or the [weight](#) methods.

Dimnames These are inherited from [Matrix-class](#) but are named docs and features respectively.

See Also

[dfm](#)

Examples

dictionary	<i>create a dictionary</i>
------------	----------------------------

Description

Create a quanteda dictionary, either from a list or by importing from a foreign format. Currently supported formats are the Wordstat and LIWC formats.

Usage

```
dictionary(x = NULL, file = NULL, format = NULL, enc = "",
  tolower = TRUE, maxcats = 10)
```

Arguments

x	a list of character vector dictionary entries, including regular expressions (see examples)
file	file identifier for a foreign dictionary
format	character identifier for the format of the foreign dictionary. Available options are: "wordstat" format used by Provalis Research's Wordstat software "LIWC" format used by the Linguistic Inquiry and Word Count software
enc	optional encoding value for dictionaries imported in Wordstat format
tolower	if TRUE, convert all dictionary functions to lower
maxcats	optional maximum categories to which a word could belong in a LIWC dictionary file, defaults to 10 (which is more than the actual LIWC 2007 dictionary uses). The default value of 10 is likely to be more than enough.

Value

A list with a ductionary class label, to be used by other functions in quanteda.

Note

We will eventually change this to an S4 class with validators and additional methods.

References

Wordstat dictionaries page, from Provalis Research <http://provalisresearch.com/products/content-analysis-software/wordstat-dictionary/>.

Pennebaker, J.W., Chung, C.K., Ireland, M., Gonzales, A., & Booth, R.J. (2007). The development and psychometric properties of LIWC2007. [Software manual]. Austin, TX (www.liwc.net).

See Also

[dfm](#)

Examples

```
mycorpus <- subset(inaugCorpus, Year>1900)
mydict <-
  dictionary(list(christmas=c("Christmas", "Santa", "holiday"),
                 opposition=c("Opposition", "reject", "notincorpus"),
                 taxing="taxing",
                 taxation="taxation",
                 taxregex="tax*",
                 country="united states"))
dfm(mycorpus, dictionary=mydict)
## Not run:
# import the Laver-Garry dictionary from http://bit.ly/1FH2nvf
lgdict <- dictionary(file="~/Dropbox/QUANTESS/dictionaries/Misc Provalis/LaverGarry.cat",
                    format="wordstat")
dfm(inaugTexts, dictionary=lgdict)

# import a LIWC formatted dictionary
liwcdict <- dictionary(file = "~/Dropbox/QUANTESS/dictionaries/LIWC/LIWC2001_English.dic",
                     format = "LIWC")
dfm(inaugTexts, dictionary=liwcdict)

## End(Not run)
```

docfreq

get the document frequency of a feature

Description

Returns the document frequency of a feature in a [dfm-class](#) object, which occurs greater than a threshold.

Usage

```
docfreq(object, threshold = 0)

## S4 method for signature dfmDense,numeric
docfreq(object, threshold = 0)
```

```
## S4 method for signature dfmDense,missing
docfreq(object, threshold = 0)

## S4 method for signature dfmSparse,numeric
docfreq(object, threshold = 0)

## S4 method for signature dfmSparse,missing
docfreq(object, threshold = 0)

## S4 method for signature dfm,numeric
docfreq(object, threshold = 0)

## S4 method for signature dfm,missing
docfreq(object, threshold = 0)
```

Arguments

object	a dfm-class document-feature matrix
threshold	numeric value of the threshold for counting a feature as existing in the document, default is 0

docnames	<i>get or set document names</i>
----------	----------------------------------

Description

Extract the document names from a corpus or a document-feature matrix. Document names are the rownames of the documents data.frame in a corpus, or the rownames of the [dfm](#) object for a dfm. of the [dfm](#) object.

docnames queries the document names of a corpus or a dfm

docnames <- assigns new values to the document names of a corpus. (Does not work for dfm objects, whose document names are fixed.)

Usage

```
docnames(x)

## S3 method for class corpus
docnames(x)

docnames(x) <- value

## S3 method for class dfm
docnames(x)
```

Arguments

x	the object with docnames
value	a character vector of the same length as x

Value

docnames returns a character vector of the document names

docnames<- assigns a character vector of the document names in a corpus

Examples

```
# query the document names of the inaugural speech corpus
docnames(inaugCorpus) <- paste("Speech", 1:ndoc(inaugCorpus), sep="")

# reassign the document names of the inaugural speech corpus
docnames(inaugCorpus) <- paste("Speech", 1:ndoc(inaugCorpus), sep="")
# query the document names of a dfm
docnames(dfm(inaugTexts[1:5]))
```

docvars	<i>get or set for document-level variables</i>
---------	--

Description

Get or set variables for the documents in a corpus

Usage

```
docvars(x, field = NULL)

docvars(x, field = NULL) <- value
```

Arguments

x	corpus whose document-level variables will be read or set
field	string containing the document-level variable name
value	the new values of the document-level variable

Value

docvars returns a data.frame of the document-level variables

docvars<- assigns value to the named field

Examples

```
head(docvars(inaugCorpus))
docvars(inaugCorpus, "President") <- paste("prez", 1:ndoc(inaugCorpus), sep="")
head(docvars(inaugCorpus))
```

encoding	<i>get the encoding of documents in a corpus</i>
----------	--

Description

Get or set the `_encoding` document-level metadata field(s) in a corpus.

Usage

```
encoding(x, drop = TRUE)
```

```
encoding(x) <- value
```

Arguments

<code>x</code>	a corpus object
<code>drop</code>	return as a vector if TRUE, otherwise return a <code>data.frame</code>
<code>value</code>	a character vector or scalar representing the new value of the encoding (see Note)

Details

This function modifies the `_encoding` value set by [metadoc](#). It is a wrapper for `metadoc(corp, "encoding")`.

Note

This function differs from R's built-in [Encoding](#) function, which only allows the four values of "latin1", "UTF-8", "bytes", and "unknown" (and which assigns "unknown" to any text that contains only ASCII characters). Legal values for encodings must be from [iconvlist](#). Note that encoding does not convert or set encodings, it simply records a user declaration of a valid encoding. (We hope to implement checking and conversion later.)

features	<i>extract the feature labels from a dfm</i>
----------	--

Description

Extract the features from a document-feature matrix, which are stored as the column names of the [dfm](#) object.

Usage

```
features(x)
```

```
## S3 method for class dfm
features(x)
```

Arguments

<code>x</code>	the object (dfm) whose features will be extracted
----------------	---

Value

Character vector of the features

Examples

```
features(dfm(inaugTexts))[1:50] # first 50 features (alphabetically sorted)
```

inaugCorpus	<i>A corpus of US presidential inaugural addresses from 1789-2013</i>
-------------	---

Description

inaugCorpus is the [quanteda-package](#) corpus object of US presidents' inaugural addresses since 1789. Document variables contain the year of the address and the last name of the president.

inaugTexts is the character vector of US presidential inauguration speeches

References

<https://archive.org/details/Inaugural-Address-Corpus-1789-2009> and <http://www.presidency.ucsb.edu/inaugurals.php>.

Examples

```
# some operations on the inaugural corpus
data(inaugCorpus)
summary(inaugCorpus)
head(docvars(inaugCorpus), 10)
# working with the character vector only
data(inaugTexts)
str(inaugTexts)
head(docvars(inaugCorpus), 10)
mycorpus <- corpus(inaugTexts)
```

kwic	<i>List key words in context from a text or a corpus of texts.</i>
------	--

Description

For a text or a collection of texts (in a quanteda corpus object), return a list of a keyword supplied by the user in its immediate context, identifying the source text and the word index number within the source text. (Not the line number, since the text may or may not be segmented using end-of-line delimiters.)

Usage

```
kwic(x, word, window = 5, wholeword = FALSE)

## S3 method for class character
kwic(x, word, window = 5, wholeword = FALSE)

## S3 method for class corpus
kwic(x, word, window = 5, wholeword = FALSE)
```

Arguments

x	A text character scalar or a quanteda corpus. (Currently does not support character vectors.)
word	A keyword chosen by the user.
window	The number of context words to be displayed around the keyword.
wholeword	If TRUE, then only search for the entire "word". Otherwise word is interpreted as a regular expression, which matches any occurrence of word in the text, so that the concordance will include all words in which the search term appears, and not just when it appears as an entire word. For instance, searching for the word "key" will also return "whiskey". This is the default.

Value

A data frame with the context before (preword), the keyword in its original format (word, preserving case and attached punctuation), and the context after (postword). The rows of the dataframe will be named with the word index position, or the text name and the index position for a corpus object.

Author(s)

Kenneth Benoit and Paul Nulty

Examples

```
kwic(inaugTexts, "terror")
kwic(inaugTexts, "terror", wholeword=TRUE) # returns only whole word, without trailing punctuation
```

language	<i>get or set the language of corpus documents</i>
----------	--

Description

Get or set the `_language` document-level metadata field in a corpus.

Usage

```
language(corp, drop = TRUE)
```

```
language(corp) <- value
```

Arguments

corp	a corpus object
drop	return as a vector if TRUE, otherwise return a <code>data.frame</code>
value	the new value for the language meta-data field, a string or character vector equal in length to <code>ndoc(corp)</code>

Details

This function modifies the `_language` value set by [metadoc](#). It is a wrapper for `metadoc(corp, "language")`.

LBGexample	<i>dfm containing example data from Table 1 of Laver Benoit and Garry (2003)</i>
------------	--

Description

Example data to demonstrate the Wordscores algorithm, from Laver Benoit and Garry (2003)

Format

A [dfm](#) object with 6 documents and 37 features

Details

This is the example word count data from Laver, Benoit and Garry's (2003) Table 1. Documents R1 to R5 are assumed to have known positions: -1.5, -0.75, 0, 0.75, 1.5. Document V1 is assumed unknown, and will have a raw text score of approximately -0.45 when computed as per LBG (2003).

References

Laver, Michael, Kenneth Benoit, and John Garry. 2003. "[Estimating policy positions from political text using words as data.](#)" American Political Science Review 97(2): 311-331.

lexdiv	<i>calculate lexical diversity</i>
--------	------------------------------------

Description

Calculate the lexical diversity or complexity of text(s).

Usage

```
lexdiv(x, ...)

## S3 method for class dfm
lexdiv(x, measure = c("TTR", "C", "R", "CTTR", "U", "S",
  "Maas"), log.base = 10, ...)

## S3 method for class numeric
lexdiv(x, measure = c("TTR", "C", "R", "CTTR", "U", "S",
  "Maas"), log.base = 10, ...)
```

Arguments

x	a document-feature matrix object
...	additional arguments
measure	A character vector defining the measure to calculate.
log.base	A numeric value defining the base of the logarithm.

Details

lexdiv calculates a variety of proposed indices for lexical diversity. In the following formulae, N refers to the total number of tokens, and V to the number of types:

"TTR": The ordinary *Type-Token Ratio*:

$$TTR = \frac{V}{N}$$

"C": Herdan's C (Herdan, 1960, as cited in Tweedie & Baayen, 1998; sometimes referred to as *LogTTR*):

$$C = \frac{\log V}{\log N}$$

"R": Guiraud's *Root TTR* (Guiraud, 1954, as cited in Tweedie & Baayen, 1998):

$$R = \frac{V}{\sqrt{N}}$$

"CTTR": Carroll's *Corrected TTR*:

$$CTTR = \frac{V}{\sqrt{2N}}$$

"U": Dugast's *Uber Index* (Dugast, 1978, as cited in Tweedie & Baayen, 1998):

$$U = \frac{(\log N)^2}{\log N - \log V}$$

"S": Summer's index:

$$S = \frac{\log \log V}{\log \log N}$$

"K": Yule's K (Yule, 1944, as cited in Tweedie & Baayen, 1998) is calculated by:

$$K = 10^4 \times \frac{(\sum_{X=1}^X f_X X^2) - N}{N^2}$$

where N is the number of tokens, X is a vector with the frequencies of each type, and f_X is the frequencies for each X .

"Maas": Maas' indices (a , $\log V_0$ & $\log_e V_0$):

$$a^2 = \frac{\log N - \log V}{\log N^2}$$

$$\log V_0 = \frac{\log V}{\sqrt{1 - \frac{\log V^2}{\log N}}}$$

The measure was derived from a formula by Mueller (1969, as cited in Maas, 1972). $\log_e V_0$ is equivalent to $\log V_0$, only with e as the base for the logarithms. Also calculated are a , $\log V_0$ (both not the same as before) and V' as measures of relative vocabulary growth while the text progresses. To calculate these measures, the first half of the text and the full text will be examined (see Maas, 1972, p. 67 ff. for details). Note: for the current method (for a dfm) there is no computation on separate halves of the text.

Value

a vector of lexical diversity statistics, each corresponding to an input document

Note

This implements only the static measures of lexical diversity, not more complex measures based on windows of text such as the Mean Segmental Type-Token Ratio, the Moving-Average Type-Token Ratio (Covington & McFall, 2010), the MLTD or MLTD-MA (Moving-Average Measure of Textual Lexical Diversity) proposed by McCarthy & Jarvis (2010) or Jarvis (no year), or the HD-D version of vocd-D (see McCarthy & Jarvis, 2007). These are available from the package **korRpus**.

Author(s)

Kenneth Benoit, adapted from the S4 class implementation written by Meik Michalke in the **korRpus** package.

References

- Covington, M.A. & McFall, J.D. (2010). Cutting the Gordian Knot: The Moving-Average Type-Token Ratio (MATTR). *Journal of Quantitative Linguistics*, 17(2), 94–100.
- Maas, H.-D., (1972). "Über den Zusammenhang zwischen Wortschatzumfang und L"ange eines Textes. *Zeitschrift f"ur Literaturwissenschaft und Linguistik*, 2(8), 73–96.
- McCarthy, P.M. & Jarvis, S. (2007). vocd: A theoretical and empirical evaluation. *Language Testing*, 24(4), 459–488.
- McCarthy, P.M. & Jarvis, S. (2010). MTLTD, vocd-D, and HD-D: A validation study of sophisticated approaches to lexical diversity assessment. *Behaviour Research Methods*, 42(2), 381–392.
- Michalke, Meik. (2014) *koRpus: An R Package for Text Analysis*. Version 0.05-5. <http://reaktanz.de/?c=hacking&s=koRpus>
- Tweedie, F.J. & Baayen, R.H. (1998). How Variable May a Constant Be? Measures of Lexical Richness in Perspective. *Computers and the Humanities*, 32(5), 323–352.

Examples

```
mydfm <- dfm(inaugCorpus)
mydfmSW <- dfm(inaugCorpus, stopwords=TRUE)
results <- data.frame(TTR = lexdiv(mydfm, "TTR"),
                      CTTR = lexdiv(mydfm, "CTTR"),
                      U = lexdiv(mydfm, "U"),
                      TTRs = lexdiv(mydfmSW, "TTR"),
                      CTTRs = lexdiv(mydfmSW, "CTTR"),
                      Us = lexdiv(mydfmSW, "U"))

results
cor(results)
t(lexdiv(mydfmSW, "Maas"))
```

metacorporus

get or set corpus metadata

Description

Get or set the corpus-level metadata in a quanteda corpus object.

Usage

```
metacorporus(corp, field = NULL)

metacorporus(corp, field) <- value
```

Arguments

corp	A quanteda corpus object
field	Metadata field name(s). If NULL (default), return all metadata names.
value	new value of the corpus metadata field

Value

For metacorporus, a list of the metadata fields in the corpus. If a list is not what you wanted, you can wrap the results in [unlist](#), but this will remove any metadata field that is set to NULL.

For metacorporus <-, the corpus with the updated metadata.

Examples

```
metacorporus(inaugCorpus)
metacorporus(inaugCorpus, "source")
metacorporus(inaugCorpus, "citation") <- "Presidential Speeches Online Project (2014)."
```

metadoc

get or set document-level meta-data

Description

Get or set the document-level meta-data, including reserved fields for language and corpus.

Usage

```
metadoc(corp, field = NULL)

metadoc(corp, field = NULL) <- value
```

Arguments

corp	A quanteda corpus object
field	string containing the name of the metadata field(s) to be queried or set
value	the new value of the new meta-data field

Value

For texts, a character vector of the texts in the corpus.

For texts <-, the corpus with the updated texts.

Note

Document-level meta-data names are preceded by an underscore character, such as `_encoding`, but when named in the `field` argument, do *not* need the underscore character.

Examples

```
mycorp <- subset(inaugCorpus, Year>1990)
summary(mycorp, showmeta=TRUE)
metadoc(mycorp, "encoding") <- "UTF-8"
metadoc(mycorp)
metadoc(mycorp, "language") <- "english"
summary(mycorp, showmeta=TRUE)
```

ndoc

*get the number of documents or features***Description**

Returns the number of documents or features in a quanteda object.

Usage

```
ndoc(x)

## S3 method for class corpus
ndoc(x)

## S3 method for class dfm
ndoc(x, ...)

nfeature(x)

## S3 method for class corpus
nfeature(x)

## S3 method for class dfm
nfeature(x)
```

Arguments

<code>x</code>	a corpus or dfm object
<code>...</code>	additional parameters

Value

an integer (count) of the number of documents or features in the corpus or dfm

Examples

```
ndoc(inaugCorpus)
ndoc(dfm(inaugCorpus))
nfeature(dfm(inaugCorpus))
nfeature(trim(dfm(inaugCorpus), minDoc=5, minCount=10))
```

ngrams*Create ngrams*

Description

Create a set of ngrams (words in sequence) from text(s) in a character vector

Usage

```
ngrams(text, n = 2, concatenator = "_", include.all = FALSE, ...)
```

Arguments

<code>text</code>	character vector containing the texts from which ngrams will be extracted
<code>n</code>	the number of tokens to concatenate. Default is 2 for bigrams.
<code>concatenator</code>	character for combining words, default is <code>_</code> (underscore) character
<code>include.all</code>	if TRUE, add n-1...1 grams to the returned list
<code>...</code>	additional parameters

Details

`...` provides additional arguments passed to [tokenize](#)

Value

a list of character vectors of ngrams, one list element per text

Author(s)

Ken Benoit, Kohei Watanabe, Paul Nulty

Examples

```
ngrams("The quick brown fox jumped over the lazy dog.", n=2)
identical(ngrams("The quick brown fox jumped over the lazy dog.", n=2),
          bigrams("The quick brown fox jumped over the lazy dog.", n=2))
ngrams("The quick brown fox jumped over the lazy dog.", n=3)
ngrams("The quick brown fox jumped over the lazy dog.", n=3, concatenator="~")
ngrams("The quick brown fox jumped over the lazy dog.", n=3, include.all=TRUE)
```

phrasetotoken	<i>convert phrases into single tokens</i>
---------------	---

Description

Replace multi-word phrases in text(s) with a compound version of the phrases concatenated with concatenator (by default, the "_" character) to form a single token. This prevents tokenization of the phrases during subsequent processing by eliminating the whitespace delimiter.

Usage

```
phrasetotoken(object, phrases, concatenator = "_")

## S4 method for signature character,dictionary
phrasetotoken(object, phrases,
  concatenator = "_")

phrasetotoken.corpus(object, phrases, concatenator = "_")

## S4 method for signature character,data.table
phrasetotoken(object, phrases,
  concatenator = "_")
```

Arguments

object	source texts, a character or character vector
phrases	a dictionary object that contains some phrases, defined as multiple words delimited by whitespace, up to 9 words long; or a quanteda collocation object created by collocations
concatenator	the concatenation character that will connect the words making up the multi-word phrases. The default _ is highly recommended since it will not be removed during normal cleaning and tokenization (while nearly all other punctuation characters, at least those in the POSIX class [:punct:]) will be removed.

Value

character or character vector of texts with phrases replaced by compound "words" joined by the concatenator

Author(s)

Kenneth Benoit

Examples

```
mytexts <- c("The new law included a capital gains tax, and an inheritance tax.",
  "New York City has raised a taxes: an income tax and a sales tax.")
mydict <- dictionary(list(tax=c("tax", "income tax", "capital gains tax", "inheritance tax")))
(cw <- phrasetotoken(mytexts, mydict))
dfm(cw, verbose=FALSE)
```

```
# when used as a dictionary for dfm creation
mydfm2 <- dfm(cw, dictionary=lapply(mydict, function(x) gsub(" ", "_", x)))
mydfm2
# to pick up "taxes" in the second text, set dictionary_regex=TRUE
mydfm3 <- dfm(cw, dictionary=lapply(mydict, phrasetoToken, mydict),
              dictionary_regex=TRUE)
mydfm3
## one more token counted for "tax" than before
```

plot.dfm

plot features as a wordcloud

Description

The default plot method for a [dfm](#) object. Produces a wordcloud plot for the features of the dfm, weighted by the total frequencies. To produce word cloud plots for specific documents, the only way currently to do this is to produce a dfm only from the documents whose features you want plotted.

Usage

```
## S3 method for class dfm
plot(x, ...)
```

Arguments

x	a dfm object
...	additional parameters passed to wordcloud or to text (and strheight , strwidth)

See Also

[wordcloud](#)

Examples

```
# plot the features (without stopwords) from Obamas two inaugural addresses
mydfm <- dfm(subset(inaugCorpus, President=="Obama"), verbose=FALSE, stopwords=TRUE)
plot(mydfm)

# plot only Lincoln's inaugural address
plot(dfm(subset(inaugCorpus, President=="Lincoln"), verbose=FALSE, stopwords=TRUE))

# plot in colors with some additional options passed to wordcloud
plot(mydfm, random.color=TRUE, rot.per=.25, colors=sample(colors()[2:128], 5))
```

print.dfm	<i>print a dfm object</i>
-----------	---------------------------

Description

print methods for document-feature matrices

Usage

```
## S4 method for signature dfmSparse
print(x, show.values = FALSE, show.settings = FALSE,
      ...)

## S4 method for signature dfmDense
print(x, show.values = FALSE, show.settings = FALSE,
      ...)

## S4 method for signature dfmSparse
show(object)

## S4 method for signature dfmDense
show(object)

## S3 method for class dfm
print(x, show.values = FALSE, show.settings = FALSE, ...)
```

Arguments

x	the dfm to be printed
show.values	print the dfm as a matrix or array (if resampled).
show.settings	Print the settings used to create the dfm. See settings .
...	further arguments passed to or from other methods
object	the item to be printed

removeFeatures	<i>remove features from an object</i>
----------------	---------------------------------------

Description

This function removes features from a variety of objects, such as text, a dfm, or a list of collocations. The most common usage for `removeFeatures` will be to eliminate stop words from a text or text-based object. Some commonly used built-in stop words can be accessed through [stopwords](#).

Usage

```
removeFeatures(x, stopwords = NULL, verbose = TRUE, ...)

## S3 method for class character
removeFeatures(x, stopwords = NULL, verbose = TRUE, ...)

## S3 method for class dfm
removeFeatures(x, stopwords = NULL, verbose = TRUE, ...)

## S3 method for class collocations
removeFeatures(x, stopwords = NULL, verbose = TRUE,
  pos = c(1, 2, 3), ...)

stopwordsRemove(x, stopwords = NULL, verbose = TRUE)
```

Arguments

x	object from which stopwords will be removed
stopwords	character vector of features to remove. Now requires an explicit list to be supplied, for instance <code>stopwords("english")</code> .
verbose	if TRUE print message about how many features were removed
...	additional arguments for some methods (such as <code>pos</code> for collocations)
pos	indexes of word position if called on <code>collocations</code> : remove if word pos is a stopword

Details

Because we believe the user should take full responsibility for any features that are removed, we do not provide a default list. Use [stopwords](#) instead.

Value

an object with stopwords removed

Author(s)

Kenneth Benoit

See Also

[stopwords](#)

Examples

```
## examples for character objects
someText <- "Heres some text containing words we want to remove."
removeFeatures(someText, stopwords("english", verbose=FALSE))
removeFeatures(someText, stopwords("SMART", verbose=FALSE))
removeFeatures(someText, c("some", "want"))
itText <- "Ecco alcuni di testo contenente le parole che vogliamo rimuovere."
removeFeatures(itText, stopwords("italian", verbose=FALSE))

## example for dfm objects
```

```
mydfm <- dfm(ukimmigTexts, verbose=FALSE)
removeFeatures(mydfm, stopwords("english", verbose=FALSE))

## example for collocations
(myCollocs <- collocations(inaugTexts, top=20))
removeFeatures(myCollocs, stopwords("english", verbose=FALSE))
```

segment

segment texts into component elements

Description

Segment text(s) into tokens, sentences, paragraphs, or other sections. `segment` works on a character vector or corpus object, and allows the delimiters to be defined. See details.

Usage

```
segment(x, ...)
```

```
## S3 method for class character
segment(x, what = c("tokens", "sentences", "paragraphs",
  "tags", "other"), delimiter = ifelse(what == "tokens", " ", ifelse(what ==
  "sentences", "[.!?:;]", ifelse(what == "paragraphs", "\\n{2}", ifelse(what
  == "tags", "##\\w+\\b", NULL))))), perl = FALSE, ...)
```

```
## S3 method for class corpus
segment(x, what = c("tokens", "sentences", "paragraphs",
  "tags", "other"), delimiter = ifelse(what == "tokens", " ", ifelse(what ==
  "sentences", "[.!?:;]", ifelse(what == "paragraphs", "\\n{2}", ifelse(what
  == "tags", "##\\w+\\b", NULL))))), perl = FALSE, ...)
```

Arguments

<code>x</code>	text or corpus object to be segmented
<code>...</code>	provides additional passed to the regular expression, such as <code>perl=TRUE</code> , or arguments to be passed to clean if <code>what=tokens</code> ,
<code>what</code>	unit of segmentation. Current options are tokens, sentences, paragraphs, and other. Segmenting on other allows segmentation of a text on any user-defined value, and must be accompanied by the <code>delimiter</code> argument.
<code>delimiter</code>	delimiter defined as a regex for segmentation. Each type has its own default, except other, which requires a value to be specified.
<code>perl</code>	logical. Should Perl-compatible regular expressions be used?

Details

Tokens are delimited by whitespace. For sentences, the delimiter can be defined by the user. The default for sentences includes `.`, `!`, `?`, plus `;` and `:`.

For paragraphs, the default is two carriage returns, although this could be changed to a single carriage return by changing the value of `delimiter` to `"\\n{1}"` which is the R version of the [regex](#) for one newline character. (You might need this if the document was created in a word processor, for instance, and the lines were wrapped in the window rather than being hard-wrapped with a newline character.)

Value

A list of segmented texts, with each element of the list corresponding to one of the original texts.

Note

Does not currently record document segments if segmenting a multi-text corpus into smaller units. For this, use [changeunits](#) instead.

Examples

```
# same as tokenize()
identical(tokenize(ukimmigTexts, lower=FALSE), segment(ukimmigTexts, lower=FALSE))

# segment into paragraphs
segment(ukimmigTexts[3:4], "paragraphs")

# segment a text into sentences
segmentedChar <- segment(ukimmigTexts, "sentences")
segmentedChar[2]
testCorpus <- corpus("##INTRO This is the introduction.
                    ##DOC1 This is the first document.
                    Second sentence in Doc 1.
                    ##DOC3 Third document starts here.
                    End of third document.")
testCorpusSeg <- segment(testCorpus, "tags")
summary(testCorpusSeg)
texts(testCorpusSeg)
# segment a corpus into sentences
segmentedCorpus <- segment(corpus(ukimmigTexts), "sentences")
identical(ndoc(segmentedCorpus), length(unlist(segmentedChar)))
```

 settings

Get or set the corpus settings

Description

Get or set the corpus settings

Get or set various settings in the corpus for the treatment of texts, such as rules for stemming, stopwords, collocations, etc.

Get the settings from a which a [dfm](#) was created

Usage

```
settings(x, ...)

## Default S3 method:
settings(x = NULL, ...)

## S3 method for class corpus
settings(x, field = NULL, ...)

settings(x, field) <- value
```

```
## S3 method for class dfm
settings(x, ...)

## S3 method for class settings
print(x, ...)
```

Arguments

<code>x</code>	object from/to which settings are queried or applied
<code>...</code>	additional arguments
<code>field</code>	string containing the name of the setting to be set or queried <code>settings(x)</code> query the corpus settings <code>settings(x, field) <-</code> update the corpus settings for field
<code>value</code>	new setting value

Details

Calling `settings()` with no arguments returns a list of system default settings.

Examples

```
settings(inaugCorpus, "stopwords")
tempdfm <- dfm(inaugCorpus)
tempdfmSW <- dfm(inaugCorpus, stopwords=TRUE)
settings(inaugCorpus, "stopwords") <- TRUE
tempdfmSW <- dfm(inaugCorpus)
tempdfm <- dfm(inaugCorpus, stem=TRUE)
settings(tempdfm)
```

similarity

compute similarities between documents and/or features

Description

Compute similarities between documents and/or features from a [dfm](#). Uses the similarity measures defined in [simil](#). See [pr_DB](#) for available distance measures, or how to create your own.

Usage

```
similarity(x, selection, n = 10, margin = c("features", "documents"),
  method = "correlation", sort = TRUE, normalize = TRUE, digits = 4)

## S4 method for signature dfm,index
similarity(x, selection, n = 10,
  margin = c("features", "documents"), method = "correlation",
  sort = TRUE, normalize = TRUE, digits = 4)
```

Arguments

<code>x</code>	a <code>dfm</code> object
<code>selection</code>	character or character vector of document names or feature labels from the <code>dfm</code>
<code>n</code>	the top <code>n</code> most similar items will be returned, sorted in descending order. If <code>n</code> is <code>NULL</code> , return all items.
<code>margin</code>	identifies the margin of the <code>dfm</code> on which similarity will be computed: features for word/term features or documents for documents.
<code>method</code>	a valid method for computing similarity from <code>pr_DB</code>
<code>sort</code>	sort results in descending order if <code>TRUE</code>
<code>normalize</code>	if <code>TRUE</code> , normalize the <code>dfm</code> by term frequency within document (so that the <code>dfm</code> values will be relative term frequency within each document)
<code>digits</code>	digits for rounding results

Value

a named list of the selection labels, with a sorted named vector of similarity measures.

Note

The method for computing feature similarities can be quite slow when there are large numbers of feature types. Future implementations will hopefully speed this up.

Examples

```
# create a dfm from inaugural addresses from Reagan onwards
presDfm <- dfm(subset(inaugCorpus, Year>1980), stopwords=TRUE, stem=TRUE)

# compute some document similarities
similarity(presDfm, "1985-Reagan", n=5, margin="documents")
similarity(presDfm, c("2009-Obama" , "2013-Obama"), n=5, margin="documents")
similarity(presDfm, c("2009-Obama" , "2013-Obama"), n=NULL, margin="documents")
similarity(presDfm, c("2009-Obama" , "2013-Obama"), n=NULL, margin="documents", method="cosine")
similarity(presDfm, "2005-Bush", n=NULL, margin="documents", method="eJaccard", sort=FALSE)

# compute some term similarities
similarity(presDfm, c("fair", "health", "terror"), method="cosine")

## Not run:

# compare to tm
require(tm)
data("crude")
crude <- tm_map(crude, content_transformer(tolower))
crude <- tm_map(crude, removePunctuation)
crude <- tm_map(crude, removeNumbers)
crude <- tm_map(crude, stemDocument)
tdm <- TermDocumentMatrix(crude)
findAssocs(tdm, c("oil", "opec", "xyz"), c(0.75, 0.82, 0.1))
# in quanteda
crudeDfm <- dfm(corpus(crude))
similarity(crudeDfm, c("oil", "opec", "xyz"), normalize=FALSE, digits=2)

## End(Not run)
```

sort.dfm	<i>sort a dfm by one or more margins</i>
----------	--

Description

Sorts a [dfm](#) by frequency of total features, total features in documents, or both

Usage

```
## S3 method for class dfm
sort(x, decreasing = TRUE, margin = c("features", "docs",
  "both"), ...)
```

Arguments

x	Document-feature matrix created by dfm
decreasing	TRUE (default) if sort will be in descending order, otherwise sort in increasing order
margin	which margin to sort on features to sort by frequency of features, docs to sort by total feature counts in documents, and both to sort by both
...	additional arguments passed to base method <code>sort.int</code>

Value

A sorted [dfm](#) matrix object

Author(s)

Ken Benoit

Examples

```
dtm <- dfm(inaugCorpus)
dtm[1:10, 1:5]
dtm <- sort(dtm)
sort(dtm)[1:10, 1:5]
sort(dtm, TRUE, "both")[1:10, 1:5] # note that the decreasing=TRUE argument
# must be second, because of the order of the
# formals in the generic method of sort()
```

`stopwords`*access built-in stopwords*

Description

This function retrieves stopwords from the type specified in the `kind` argument and returns the stopword list as a character vector. The default is English.

Usage

```
stopwords(kind = "english", verbose = FALSE)
```

```
stopwordsGet(kind = "english")
```

Arguments

<code>kind</code>	The pre-set kind of stopwords (as a character string). Allowed values are <code>english</code> , <code>SMART</code> , <code>danish</code> , <code>french</code> , <code>hungarian</code> , <code>norwegian</code> , <code>russian</code> , <code>swedish</code> , <code>catalan</code> , <code>dutch</code> , <code>finnish</code> , <code>german</code> , <code>italian</code> , <code>portuguese</code> , <code>spanish</code> , <code>arabic</code>
<code>verbose</code>	if <code>FALSE</code> , suppress the annoying warning note

Details

The stopword list are SMART English stopwords from the SMART information retrieval system (obtained from <http://jmlr.csail.mit.edu/papers/volume5/lewis04a/a11-smart-stop-list/english.stop>) and a set of stopword lists from the Snowball stemmer project in different languages (obtained from http://svn.tartarus.org/snowball/trunk/website/algorithms/*/stop.txt). Supported languages are `arabic`, `danish`, `dutch`, `english`, `finnish`, `french`, `german`, `hungarian`, `italian`, `norwegian`, `portuguese`, `russian`, `spanish`, and `swedish`. Language names are case sensitive.

Value

a character vector of stopwords

A note of caution

Stop words are an arbitrary choice imposed by the user, and accessing a pre-defined list of words to ignore does not mean that it will perfectly fit your needs. You are strongly encouraged to inspect the list and to make sure it fits your particular requirements.

Examples

```
stopwords("english")[1:5]  
stopwords("italian")[1:5]  
stopwords("arabic")[1:5]
```

subset.corpus	<i>extract a subset of a corpus</i>
---------------	-------------------------------------

Description

Works just like the normal subset command but for corpus objects

Usage

```
## S3 method for class corpus
subset(x, subset = NULL, select = NULL, ...)
```

Arguments

x	corpus object to be subsetted.
subset	logical expression indicating elements or rows to keep: missing values are taken as false.
select	expression, indicating the attributes to select from the corpus
...	additional arguments affecting the summary produced

Value

corpus object

Examples

```
summary(subset(inaugCorpus, Year>1980))
summary(subset(inaugCorpus, Year>1930 & President=="Roosevelt", select=Year))
```

summary.corpus	<i>summarize a corpus or a vector of texts</i>
----------------	--

Description

Displays information about a corpus or vector of texts. For a corpus, this includes attributes and metadata such as date of number of texts, creation and source. For texts, prints to the console a description of the texts, including number of types, tokens, and sentences.

Usage

```
## S3 method for class corpus
summary(object, n = 100, verbose = TRUE,
  showmeta = FALSE, ...)

## S3 method for class character
summary(object, verbose = TRUE, ...)

describeTexts(object, verbose = TRUE, ...)
```

Arguments

object	corpus or texts to be summarized
n	maximum number of texts to describe, default=100
verbose	set to FALSE to turn off printed output, for instance if you simply want to assign the output to a <code>data.frame</code>
showmeta	for a corpus, set to TRUE to include document-level meta-data
...	additional arguments affecting the summary produced

Examples

```
# summarize corpus information
summary(inaugCorpus)
summary(inaugCorpus, n=10)
mycorpus <- corpus(ukimmigTexts, docvars=data.frame(party=names(ukimmigTexts)), enc="UTF-8")
summary(mycorpus, showmeta=TRUE) # show the meta-data
mysummary <- summary(mycorpus, verbose=FALSE) # (quietly) assign the results
mysummary$Types / mysummary$Tokens          # crude type-token ratio
#
# summarize texts
summary(c("testing this text", "and this one"))
summary(ukimmigTexts)
myTextSummaryDF <- summary(ukimmigTexts, verbose=FALSE)
```

syllables	<i>count syllables in a text</i>
-----------	----------------------------------

Description

This function takes a text and returns a count of the number of syllables it contains. For British English words, the syllable count is exact and looked up from the CMU pronunciation dictionary, from the default syllable dictionary `englishSyllables`. For any word not in the dictionary the syllable count is estimated by counting vowel clusters.

`englishSyllables` is a quanteda-supplied data object consisting of a named numeric vector of syllable counts for the words used as names. This is the default object used to count English syllables. This object that can be accessed directly, but we strongly encourage you to access it only through the `syllables()` wrapper function.

Usage

```
syllables(x, ...)

## S3 method for class character
syllables(x, syllableDict = englishSyllables, ...)
```

Arguments

x	character vector or list of character vectors whose syllables will be counted
...	additional arguments passed to <code>clean</code>
syllableDict	a named numeric vector of syllable counts where the names are lower case tokens. The default is englishSyllables , an English pronunciation dictionary from CMU.

Value

numeric Named vector or list of counts of the number of syllables for each element of x. When a word is not available in the lookup table, its syllables are estimated by counting the number of (English) vowels in the word.

Source

englishSyllables is built from the freely available CMU pronunciation dictionary at <http://www.speech.cs.cmu.edu/cgi-bin/cmudict>.

Examples

```
syllables("This is an example sentence.")
syllables(tokenize("This is an example sentence.", simplify=TRUE))
myTexts <- c(text1 = "Text one.",
             text2 = "Superduper text number two.",
             text3 = "One more for the road.")
syllables(myTexts)
syllables("supercalifragilisticexpialidocious")
```

textfile	<i>read a text corpus source from a file</i>
----------	--

Description

Read a text corpus from a source file, where the single file will consist of a set of texts in columns and document variables and document-level meta-data in additional columns. For spreadsheet-like files, the first row must be a header.

Usage

```
textfile(file, textField, directory = NULL, docvarsfrom = c("filenames"),
        sep = "_", docvarnames = NULL, ...)

## S4 method for signature character,index,missing,missing,missing,missing
textfile(file,
        textField, directory = NULL, docvarsfrom = c("filenames"), sep = "_",
        docvarnames = NULL, ...)

## S4 method for signature character,missing,missing,missing,missing,missing
textfile(file,
        textField, directory = NULL, docvarsfrom = c("filenames"), sep = "_",
        docvarnames = NULL, ...)

## S4 method for signature character,missing,missing,character,ANY,ANY
textfile(file,
        textField = NULL, directory = NULL, docvarsfrom = c("headers"),
        sep = "_", docvarnames = NULL, ...)
```

Arguments

file	<p>the complete filename to be read. Currently available file types are:</p> <p>txt plain text files</p> <p>json data in JavaScript Object Notation, consisting of the texts and additional document-level variables and document-level meta-data. The text key must be identified by specifying a textField value.</p> <p>csv comma separated value data, consisting of the texts and additional document-level variables and document-level meta-data. The text file must be identified by specifying a textField value.</p> <p>a wildcard value any valid pathname with a wildcard ("glob") expression that can be expanded by the operating system. This may consist of multiple file types.</p> <p>doc, docx: Word files coming soon.</p> <p>pdf: Adobe Portable Document Format files, coming soon.</p>
textField	a variable (column) name or column number indicating where to find the texts that form the documents for the corpus. This must be specified for file types .csv and .json.
directory	not used yet, and may be removed (if I move this to a new method called textfiles)
docvarsfrom	used to specify that docvars should be taken from the filenames, when the textfile inputs are filenames and the elements of the filenames are document variables, separated by a delimiter (sep). This allows easy assignment of docvars from filenames such as 1789-Washington.txt, 1793-Washington, etc. by sep or from meta-data embedded in the text file header (headers).
sep	separator used in filenames to delimit docvar elements if docvarsfrom="filenames" is used
docvarnames	character vector of variable names for docvars, if docvarsfrom is specified. If this argument is not used, default docvar names will be used (docvar1, docvar2, ...).
...	additional arguments passed through to other functions

Details

The constructor does not store a copy of the texts, but rather reads in the texts and associated data, and saves them to a temporary R object whose location is specified in the [corpusSource-class](#) object. This prevents a complete copy of the object from cluttering the global environment and consuming additional space. This does mean however that the state of the file containing the source data will not be cross-platform and may not be persistent across sessions. So the recommended usage is to load the data into a corpus in the same session in which textfile is called.

Value

an object of class [corpusSource-class](#) that can be read by [corpus](#) to construct a corpus

Author(s)

Kenneth Benoit and Paul Nulty

Examples

```
# Twitter json
mytf <- textfile("~/Dropbox/QUANTESS/corpora/misc/NinTANDO_Me.json")
summary(corpus(mytf))
# generic json - needs a textfield specifier
mytf2 <- textfile("~/Dropbox/QUANTESS/Manuscripts/Collocations/Corpora/sotu/sotu.json",
                  textfield = "text")
summary(corpus(mytf2))
# text file
mytf3 <- textfile("~/Dropbox/QUANTESS/corpora/project_gutenberg/pg2701.txt")
summary(corpus(mytf3))
mytf4 <- textfile("~/Dropbox/QUANTESS/corpora/inaugural/*.txt")
summary(corpus(mytf4))
mytf5 <- textfile("~/Dropbox/QUANTESS/corpora/inaugural/*.txt",
                  docvarsfrom="filenames", sep="-", docvarnames=c("Year", "President"))
summary(corpus(mytf5))
```

textmodel

fit a text model

Description

Fit a text model to a dfm. Creates an object of virtual class `textmodel_fitted-class`, whose exact properties (slots and methods) will depend on which model was called (see model types below).

Usage

```
textmodel(x, y = NULL, data = NULL, model = c("wordscores", "NB",
        "wordfish", "lda", "ca"), ...)

## S4 method for signature dfm,ANY,missing,character
textmodel(x, y = NULL, data = NULL,
        model = c("wordscores", "NB", "wordfish", "lda", "ca"), ...)

## S4 method for signature formula,missing,dfm,character
textmodel(x, y = NULL,
        data = NULL, model = c("wordscores", "NB", "wordfish", "lda", "ca"), ...)
```

Arguments

x	a quanteda dfm object containing feature counts by document
y	for supervised models, a vector of class labels or values for training the model, with NA for documents to be excluded from the training set; for unsupervised models, this will be left NULL
data	dfm or data.frame from which to take the formula
model	the model type to be fit. Currently implemented methods are: <div> wordscores Fits the "wordscores" model of Laver, Benoit, and Garry (2003). Options include the original linear scale of LBG or the logit scale proposed by Beauchamps (2001). See textmodel_wordscores. ca Correspondence analysis scaling of the dfm. </div>

	NB Fits a Naive Bayes model to the dfm, with options for smoothing, setting class priors, and a choice of multinomial or binomial probabilities.
	wordfish Fits the "wordfish" model of Slapin and Proksch (2008).
	lda Fit a topic model based on latent Dirichlet allocation. Temporarily removed.
	kNN k-nearest neighbour classification, coming soon.
...	additional arguments to be passed to specific model types
formula	An object of class formula of the form $y \sim x_1 + x_2 + \dots$ (Interactions are not currently allowed for any of the models implemented.) The x variable(s) is typically a dfm , and the y variable a vector of class labels or training values associated with each document.

Value

a textmodel class list, containing the fitted model and additional information specific to the model class. See the methods for specific models, e.g. [textmodel_wardscores](#), etc.

Class hierarchy

Here will go the description of the class hierarchy that governs dispatch for the predict, print, summary methods, since this is not terribly obvious. (Blame it on the S3 system.)

See Also

[textmodel](#), [textmodel_wardscores](#)

Examples

```
## Not run:
data(ie2010Corpus, package="quantedaData")
ieDfm <- dfm(ie2010Corpus, verbose=FALSE)
refscores <- c(rep(NA, 4), -1, 1, rep(NA, 8))
ws <- textmodel(ieDfm, refscores, model="wardscores", smooth=1)

# alternative formula notation - but slower
# need the - 1 to remove the intercept, as this is literal formula notation
wsform <- textmodel(refscores ~ . - 1, data=ieDfm, model="wardscores", smooth=1)
identical(ws@Sw, wsform@Sw) # compare wardscores from the two models

# compare the logit and linear wardscores
bs <- textmodel(ieDfm[5:6,], refscores[5:6], model="wardscores", scale="logit", smooth=1)
plot(ws@Sw, bs@Sw, xlim=c(-1, 1), xlab="Linear word score", ylab="Logit word score")

wf <- textmodel(ieDfm, model="wordfish", dir = c(6,5))
wf

## End(Not run)
```

textmodel_fitted-class
the fitted textmodel classes

Description

The textmodel virtual class is a parent class for more specific fitted text models, which are the result of a quantitative text analysis applied to a document-feature matrix.

Details

Available types currently include...

Slots

dfm a [dfm-class](#) document-feature matrix

textmodel_wordfish *wordfish text model*

Description

Estimate Slapin and Proksch's (2008) "wordfish" Poisson scaling model of one-dimensional document positions using conditional maximum likelihood.

Usage

```
textmodel_wordfish(data, dir = c(1, 2), priors = c(Inf, Inf, 3, 1),
  tol = c(1e-06, 1e-08))
```

```
## S3 method for class textmodel_wordfish_fitted
print(x, n = 30L, ...)
```

```
## S4 method for signature textmodel_wordfish_fitted
show(object)
```

```
## S4 method for signature textmodel_wordfish_predicted
show(object)
```

Arguments

data	the dfm on which the model will be fit
dir	set global identification by specifying the indexes for a pair of documents such that $\hat{\theta}_{dir[1]} < \hat{\theta}_{dir[2]}$.
priors	priors for θ_i , α_i , ψ_j , and β_j where i indexes documents and j indexes features
tol	tolerances for convergence (explain why a pair)
x	for print method, the object to be printed
n	max rows of dfm to print
...	additional arguments passed to other functions
object	wordfish fitted or predicted object to be shown

Details

The returns match those of Will Lowe's R implementation of [wordfish](#), except that here we have renamed words to be features. (This return list may change.) We have also followed the practice begun with Slapin and Proksch's early implementation of the model that used a regularization parameter of $se(\sigma) = 3$, through the third element in priors.

Value

An object of class `textmodel_fitted_wordfish`. This is a list containing:

<code>dir</code>	global identification of the dimension
<code>theta</code>	estimated document positions
<code>alpha</code>	estimated document fixed effects
<code>beta</code>	estimated feature marginal effects
<code>psi</code>	estimated word fixed effects
<code>docs</code>	document labels
<code>features</code>	feature labels
<code>sigma</code>	regularization parameter for betas in Poisson form
<code>ll</code>	log likelihood at convergence
<code>se.theta</code>	standard errors for theta-hats
<code>data</code>	dfm to which the model was fit

Author(s)

Benjamin Lauderdale and Kenneth Benoit

References

Jonathan Slapin and Sven-Oliver Proksch. 2008. "A Scaling Model for Estimating Time-Series Party Positions from Texts." *American Journal of Political Science* 52(3):705-772.

Examples

```
if (require(quantedaData)) {
  data(ie2010Corpus)
  ie2010dfm <- dfm(ie2010Corpus, verbose=FALSE)
  wfmodel <- textmodel_wordfish(ie2010dfm, dir = c(6,5))

  if (require(austin)) {
    wfmodelAustin <- wordfish(quanteda::as.wfm(ie2010dfm), dir = c(6,5))
    cor(wfmodel@theta, wfmodelAustin$theta)
  }
}
```

textmodel_wordscores *Wordscores text model*

Description

textmodel_wordscores implements Laver, Benoit and Garry's (2003) wordscores method for scaling of a single dimension. This can be called directly, but the recommended method is through [textmodel](#).

Usage

```
textmodel_wordscores(data, scores, scale = c("linear", "logit"), smooth = 0)

## S3 method for class textmodel_wordscores_fitted
predict(object, newdata = NULL,
        rescaling = "none", level = 0.95, verbose = TRUE, ...)

## S3 method for class textmodel_wordscores_fitted
print(x, n = 30L, digits = 2, ...)

## S4 method for signature textmodel_wordscores_fitted
show(object)

## S4 method for signature textmodel_wordscores_predicted
show(object)

## S3 method for class textmodel_wordscores_predicted
print(x, ...)
```

Arguments

data	the dfm on which the model will be fit. Does not need to contain only the training documents, since the index of these will be matched automatically.
scores	vector of training scores associated with each document identified in refData
scale	classic LBG linear posterior weighted word class differences, or logit scale of log posterior differences
smooth	a smoothing parameter for word counts; defaults to zero for the to match the LBG (2003) method.
object	the fitted wordscores textmodel on which prediction will be made
newdata	dfm on which prediction should be made
rescaling	none for "raw" scores; lbg for LBG (2003) rescaling; or mv for the rescaling proposed by Martin and Vanberg (2007). (Note to authors: Provide full details here in documentation.)
level	probability level for confidence interval width
verbose	If TRUE, output status messages
...	additional arguments passed to other functions
x	for print method, the object to be printed
n	max rows of dfm to print
digits	number of decimal places to print for print methods

Details

Fitting a `textmodel_wordscores` results in an object of class `textmodel_wordscores_fitted` containing the following slots:

Value

The `predict` method for a `wordscores` fitted object returns a `data.frame` whose rows are the documents fitted and whose columns contain the scored textvalues, with the number of columns depending on the options called (for instance, how many rescaled scores, and whether standard errors were requested.) (Note: We may very well change this soon so that it is a list similar to other existing fitted objects.)

Slots

`scale` linear or logit, according to the value of `scale`
`Sw` the scores computed for each word in the training set
`x` the dfm on which the `wordscores` model was called
`y` the reference scores
`call` the function call that fitted the model
`method` takes a value of `wordscores` for this model

Author(s)

Kenneth Benoit
 Ken Benoit

References

Laver, Michael, Kenneth R Benoit, and John Garry. 2003. "Extracting Policy Positions From Political Texts Using Words as Data." *American Political Science Review* 97(02): 311-31

Beauchamp, N. 2012. "Using Text to Scale Legislatures with Uninformative Voting." New York University Mimeo.

Martin, L W, and G Vanberg. 2007. "A Robust Transformation Procedure for Interpreting Political Text." *Political Analysis* 16(1): 93-100.

Laver, Michael, Kenneth R Benoit, and John Garry. 2003. "Extracting Policy Positions From Political Texts Using Words as Data." *American Political Science Review* 97(02): 311-31.

Martin, L W, and G Vanberg. 2007. "A Robust Transformation Procedure for Interpreting Political Text." *Political Analysis* 16(1): 93-100.

Examples

```
(ws <- textmodel(LBGexample, c(seq(-1.5, 1.5, .75), NA), model="wordscores"))
predict(ws)
predict(ws, rescaling="mv")
predict(ws, rescaling="lbg")

# same as:
(ws2 <- textmodel_wordscores(LBGexample, c(seq(-1.5, 1.5, .75), NA)))
predict(ws2)
```

texts	<i>get or set corpus texts</i>
-------	--------------------------------

Description

Get or replace the texts in a quanteda corpus object.

Usage

```
texts(corp)

texts(corp) <- value
```

Arguments

corp	A quanteda corpus object
value	character vector of the new texts

Value

For `texts`, a character vector of the texts in the corpus.
 For `texts <-`, the corpus with the updated texts.

Examples

```
texts(inaugCorpus)[1]
sapply(texts(inaugCorpus), nchar) # length in characters of the inaugural corpus texts

## this doesnt work yet - need to overload [ for this replacement function
# texts(inaugTexts)[55] <- "GW Bushs second inaugural address, the condensed version."
```

tokenize	<i>tokenize a set of texts</i>
----------	--------------------------------

Description

Tokenize the texts from a character vector or from a corpus.

Usage

```
tokenize(x, ...)

## S3 method for class character
tokenize(x, cpp = FALSE, simplify = FALSE, sep = " ",
  minLength = 1, ...)

## S3 method for class corpus
tokenize(x, ...)
```

Arguments

<code>x</code>	The text(s) or corpus to be tokenized
<code>...</code>	additional arguments passed to <code>clean</code>
<code>cpp</code>	if TRUE, tokenize and clean using C++ tokenizer, otherwise use a slower R version
<code>simplify</code>	If TRUE, return a character vector of tokens rather than a list of length <code>ndoc(texts)</code> , with each element of the list containing a character vector of the tokens corresponding to that text.
<code>sep</code>	by default, tokenize expects a "white-space" delimiter between tokens. Alternatively, <code>sep</code> can be used to specify another character which delimits fields.
<code>minLength</code>	the minimum length in characters for retaining a token, defaults to 1. Only used if <code>cpp=TRUE</code> .

Value

A list of length `ndoc(x)` of the tokens found in each text.

Author(s)

Kohei Watanabe (C++ code), Ken Benoit, and Paul Nulty

Examples

```
# same for character vectors and for lists
tokensFromChar <- tokenize(inaugTexts)
tokensFromCorp <- tokenize(inaugCorpus)
identical(tokensFromChar, tokensFromCorp)
str(tokensFromChar)
# returned as a list
head(tokenize(inaugTexts[57])[[1]], 10)
# returned as a character vector using simplify=TRUE
head(tokenize(inaugTexts[57], simplify=TRUE), 10)

# demonstrate some options with clean
head(tokenize(inaugTexts[57], simplify=TRUE, cpp=TRUE), 30)
## NOTE: not the same as
head(tokenize(inaugTexts[57], simplify=TRUE, cpp=FALSE), 30)

## MORE COMPARISONS
tokenize("this is MY <3 4U @myhandle gr8 stuff :-)", removeTwitter=FALSE, cpp=TRUE)
tokenize("this is MY <3 4U @myhandle gr8 stuff :-)", removeTwitter=FALSE, cpp=FALSE)
tokenize("great website http://textasdata.com", removeURL=FALSE, cpp=TRUE)
tokenize("great website http://textasdata.com", removeURL=FALSE, cpp=FALSE)
tokenize("great website http://textasdata.com", removeURL=TRUE, cpp=TRUE)
tokenize("great website http://textasdata.com", removeURL=TRUE, cpp=FALSE)
```

tokenizeOnly	<i>tokenizeOnly</i>
--------------	---------------------

Description

For performance comparisons of tokenize-only functions. All functions use `lapply` to return a list of tokenized texts, when `x` is a vector of texts.

Usage

```
tokenizeOnlyCppKW(x, sep = " ", minLength = 1)
```

```
tokenizeOnlyCppKB(x, sep = " ", minLength = 1)
```

```
tokenizeOnlyScan(x, sep = " ")
```

Arguments

<code>x</code>	text(s) to be tokenized
<code>sep</code>	separator delineating tokens
<code>minLength</code>	minimum length in characters of tokens to be retained

Details

`tokenizeOnlyCppKW` calls KW's original C++ function, with the cleaning options set to off.

`tokenizeOnlyCppKB` calls a C++ function that KB adapted from Kohei's code that does tokenization without the cleaning.

`tokenizeOnlyScan` calls the R function `scan` for tokenization.

Value

a list of character vectors, with each list element consisting of a tokenized text

Examples

```
# on inaugural speeches
system.time(tmp1 <- tokenizeOnlyCppKW(inaugTexts))
system.time(tmp2 <- tokenizeOnlyCppKB(inaugTexts))
system.time(tmp3 <- tokenizeOnlyScan(inaugTexts))

# on a longer set of texts
load("~/Dropbox/QUANTESS/Manuscripts/Collocations/Corpora/lauderdaleClark/Opinion_files.RData)
txts <- unlist(Opinion_files[1])
names(txts) <- NULL
system.time(tmp4 <- tokenizeOnlyCppKW(txts))
## about 9.2 seconds on Kens MacBook Pro
system.time(tmp5 <- tokenizeOnlyCppKB(txts))
## about 7.0 seconds
system.time(tmp6 <- tokenizeOnlyScan(txts))
## about 12.6 seconds
```

topfeatures	<i>list the most frequent features</i>
-------------	--

Description

List the most frequently occurring features in a [dfm](#)

Usage

```
topfeatures(x, ...)

## S3 method for class dfm
topfeatures(x, n = 10, decreasing = TRUE, ci = 0.95, ...)

## S3 method for class dgCMatix
topfeatures(x, n = 10, decreasing = TRUE, ...)
```

Arguments

x	the object whose features will be returned
...	additional arguments passed to other methods
n	how many top features should be returned
decreasing	If TRUE, return the n most frequent features, if FALSE, return the n least frequent features
ci	confidence interval from 0-1.0 for use if dfm is resampled

Value

A named numeric vector of feature counts, where the names are the feature labels.

Examples

```
topfeatures(dfm(inaugCorpus))
topfeatures(dfm(inaugCorpus, stopwords=TRUE))
# least frequent features
topfeatures(dfm(inaugCorpus), decreasing=FALSE)
```

trim	<i>Trim a dfm using threshold-based or random feature selection</i>
------	---

Description

Returns a document by feature matrix reduced in size based on document and term frequency, and/or subsampling.

Usage

```
trim(x, minCount = 1, minDoc = 1, nsample = NULL, verbose = TRUE)

## S4 method for signature dfm
trim(x, minCount = 1, minDoc = 1, nsample = NULL,
     verbose = TRUE)

trimdfm(x, ...)
```

Arguments

x	document-feature matrix of dfm-class
minCount	minimum feature count
minDoc	minimum number of documents in which a feature appears
nsample	how many features to retain (based on random selection)
verbose	print messages
...	only included to allow legacy trimdfm to pass arguments to trim

Value

A [dfm-class](#) object reduced in features

Author(s)

Ken Benoit, inspired by code by Will Lowe (see [trim](#))

Examples

```
dtm <- dfm(inaugCorpus)
dim(dtm)
dtmReduced <- trim(dtm, minCount=10, minDoc=2) # only words occuring >=5 times and in >=2 docs
dim(dtmReduced)
topfeatures(dtmReduced, decreasing=FALSE)
dtmSampled <- trim(dtm, minCount=20, nsample=50) # sample 50 words over 20 count
dtmSampled # 57 x 50 words
topfeatures(dtmSampled)
```

ukimmigTexts

Immigration-related sections of 2010 UK party manifestos

Description

Extracts from the election manifestos of 9 UK political parties from 2010, related to immigration or asylum-seekers.

Format

A named character vector of plain ASCII texts

Examples

```
data(ukimmigTexts)
ukimmigCorpus <- corpus(ukimmigTexts, docvars=list(party=names(ukimmigTexts)))
language(ukimmigCorpus) <- "english"
encoding(ukimmigCorpus) <- "UTF-8"
summary(ukimmigCorpus)
```

weight

Weight the feature frequencies in a dfm by various methods

Description

Returns a document by feature matrix with the feature frequencies weighted according to one of several common methods.

Usage

```
weight(x, ...)

## S4 method for signature dfm
weight(x, type = c("frequency", "relFreq", "relMaxFreq",
  "logFreq", "tfidf"), smooth = 0, normalize = TRUE, verbose = TRUE, ...)

tf(x)

tfidf(x)

smoother(x, smooth)

weighting(object)

## S4 method for signature dfm
weighting(object)
```

Arguments

x	document-feature matrix created by dfm
...	not currently used
type	The weighting function to apply to the dfm. One of: <ul style="list-style-type: none"> • normTf - Length normalization: dividing the frequency of the feature by the length of the document) • logTf - The natural log of the term frequency • tf-idf - Term-frequency * inverse document frequency. For a full explanation, see, for example, (http://nlp.stanford.edu/IR-book/html/htmledition/term-frequency-and-weighting-1.html). This implementation will not return negative values. • maxTf - The term frequency divided by the frequency of the most frequent term in the document • ppmi - Positive Pointwise Mutual Information

smooth	amount to apply as additive smoothing to the document-feature matrix prior to weighting, default is 0.5, set to smooth=0 for no smoothing.
normalize	if TRUE (default) then normalize the dfm by relative term frequency prior to computing tfidf
verbose	if TRUE output status messages
object	the dfm object for accessing the weighting setting

Details

tf is a shortcut for `weight(x, "relFreq")`
 tfidf is a shortcut for `weight(x, "tfidf")`
 smoother is a shortcut for `weight(x, "frequency", smooth)`
 weighting queries (but cannot set) the weighting applied to the dfm.

Value

The dfm with weighted values
 weighting returns a character object describing the type of weighting applied to the dfm.

Author(s)

Paul Nulty and Kenneth Benoit

References

Manning, Christopher D., Prabhakar Raghavan, and Hinrich Schutze. Introduction to information retrieval. Vol. 1. Cambridge: Cambridge university press, 2008.

Examples

```
dtm <- dfm(inaugCorpus)
x <- apply(dtm, 1, function(tf) tf/max(tf))
topfeatures(dtm)
normDtm <- weight(dtm)
topfeatures(normDtm)
maxTfDtm <- weight(dtm, type="relMaxFreq")
topfeatures(maxTfDtm)
logTfDtm <- weight(dtm, type="logFreq")
topfeatures(logTfDtm)
tfidfDtm <- weight(dtm, type="tfidf")
topfeatures(tfidfDtm)

# combine these methods for more complex weightings, e.g. as in Section 6.4 of
# Introduction to Information Retrieval
logTfDtm <- weight(dtm, type="logFreq")
wfidfDtm <- weight(logTfDtm, type="tfidf", normalize=FALSE)
```

wordstem

stem words

Description

Apply a stemmer to words. This is a wrapper to [wordStem](#) designed to allow this function to be called without loading the entire **SnowballC** package. [wordStem](#) uses Dr. Martin Porter's stemming algorithm and the C libstemmer library generated by Snowball.

Usage

```
wordstem(words, language = "porter")
```

Arguments

words	a character vector of words whose stems are to be extracted.
language	the name of a recognized language, as returned by <code>getStemLanguages</code> , or a two- or three-letter ISO-639 code corresponding to one of these languages (see references for the list of codes)

Value

A character vector with as many elements as there are in the input vector with the corresponding elements being the stem of the word. Elements of the vector are converted to UTF-8 encoding before the stemming is performed, and the returned elements are marked as such when they contain non-ASCII characters.

References

<http://snowball.tartarus.org/>

http://www.loc.gov/standards/iso639-2/php/code_list.php for a list of ISO-639 language codes

See Also

[wordStem](#)

Examples

```
# Simple example
wordstem(c("win", "winning", "winner"))
```

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